

Name: _____

Date: _____

Math 10F&PC Chapter 1 Measurement

1.3 Relating SI and Imperial Units

In Canada we use a system of measurement called the metric SI. The SI system of measures is based on powers of 10. However, many manufacturing sectors and businesses still use the Imperial system of measurement which is commonly used in the United States.

Conversions:

Metric

$$\begin{aligned}
 1 \text{ mm} & & 1 \text{ km} &= 1000 \text{ m} \\
 1 \text{ cm} &= 10 \text{ mm} & 1 \text{ m} &= 100 \text{ cm} \\
 1 \text{ m} &= 100 \text{ cm} & 1 \text{ cm} &= 10 \text{ mm} \\
 &= 1000 \text{ mm} \\
 1 \text{ km} &= 1000 \text{ m} = 100\,000 \text{ cm} = 1\,000\,000 \text{ mm}
 \end{aligned}$$

Imperial to Metric

$$\begin{aligned}
 1 \text{ mile} &= 1.609 \text{ kilometers} = 1609 \text{ m} \\
 1 \text{ yard} &= 0.9144 \text{ meters} = 91.44 \text{ cm} \\
 1 \text{ foot} &= 0.3048 \text{ meters} = 30.48 \text{ cm} \\
 1 \text{ inch} &= 2.54 \text{ centimeters} = 25.4 \text{ mm}
 \end{aligned}$$

Example 1: a) How many centimeters is 125 inches?

$$125 \cancel{\text{ in}} \times \frac{2.54 \text{ cm}}{1 \cancel{\text{ in}}} = \boxed{317.5 \text{ cm}}$$

ii) 32 in to mm

$$32 \cancel{\text{ in}} \times \frac{25.4 \text{ mm}}{1 \cancel{\text{ in}}} = \boxed{812.8 \text{ mm}} \approx 813 \text{ mm}$$

b) How many meters is 5'7"?

$$\begin{aligned}
 5 \text{ ft} &= 5 \text{ ft} \times \frac{0.3048 \text{ m}}{1 \text{ ft}} = 1.524 \text{ m} \\
 7'' &= 7 \text{ in} \times \frac{0.0254 \text{ m}}{1 \text{ in}} = 0.1778 \text{ m} \\
 5' 7'' &= 1.524 \text{ m} + 0.1778 \text{ m} = 1.7018 \text{ m} \approx \boxed{1.7 \text{ m}}
 \end{aligned}$$

$$\begin{aligned}
 5 \frac{7}{12} \text{ ft} &\times \frac{0.3048 \text{ m}}{1 \text{ ft}} \\
 &= 1.7018 \approx \boxed{1.7 \text{ m}}
 \end{aligned}$$

Example 2: A bowling lane is approximately 19 m long. What is this measurement to the nearest foot?

$$19 \text{ m} \times \frac{3.28 \text{ ft}}{1 \text{ m}}$$

$$= 62.33 \text{ ft}$$

$$\approx \boxed{62 \text{ ft}}$$

$$\frac{1 \text{ ft}}{0.3048} = \frac{0.3048 \text{ m}}{0.3048}$$

$$3.28 \text{ ft} = 1 \text{ m}$$

$$62 \text{ ft} \quad 0.33 \text{ ft} = 62 \text{ ft} + 0.33 \times 12 \approx \boxed{62 \text{ ft } 4 \text{ in}}$$

Example 3: After meeting in Emerson Manitoba, **Hana** drove 62 mi. South and **Jason** drove 98 k m north. Who drove farther?

$$\frac{1 \text{ mi}}{1.609} = \frac{1.609 \text{ k}}{1.609}$$

method #①

Convert From mi to K

$$62 \text{ mi} \times \frac{1.609 \text{ k}}{1 \text{ mi}}$$

$$\text{Hana} = 99.758 \text{ k}$$

$$\text{Jason} = 98.00 \text{ k}$$

Hana drove Farther

method #②

Convert From K to mi

$$98 \text{ k} \times \frac{0.6215 \text{ mi}}{1 \text{ k}}$$

$$\text{Jason} = 60.9 \text{ mi}$$

$$\text{Hana} = 62.0 \text{ mi}$$

Hana drove Farther

Example 4: Alex is 6 ft. 2 in. tall. To list his height on his driver's licence application, Alex needs to convert this measurement to centimetres.

a) What is Alex's height to the nearest centimetre?

$$6 \text{ ft } 2 \text{ in} = 6 \frac{2}{12} \text{ ft} = 6 \frac{1}{6} \text{ ft}$$

$$1 \text{ ft} = 0.3048 \text{ m}$$

$$1 \text{ ft} = 30.48 \text{ cm}$$

$$\therefore 6 \frac{1}{6} \text{ ft} \times \frac{30.48 \text{ cm}}{1 \text{ ft}} = 187.96 \text{ cm}$$

$$\approx \boxed{188 \text{ cm}}$$

Example 5: A truck driver knows that her semitrailer is 3.5 m high. The support beams of a bridge are 11 ft. 9 in. high. Will the vehicle fit under the bridge? Justify your answer.

Convert 11 ft. 9 in to meter

$$11 \frac{9}{12} \text{ ft} = 11 \frac{3}{4} \text{ ft} \times \frac{0.3048 \text{ m}}{1 \text{ ft}}$$

$$\text{H. of bridge} = 3.5814$$

$$\text{H. of truck} = 3.5$$

\therefore the truck will fit under the bridge.

there are 8.14 cm more ----